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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 09/936,359   | 01/02/2002  | Hideyuki Kurita      | 110609              | 4466             |
| 7590   | 02/17/2004  |                      | EXAMINER            |                  |
| Oliff & Berridge<br>PO Box 19928<br>Alexandria, VA 22320 |             |                      | DINH, TUAN T        |                  |
|  |             |                      | ART UNIT            | PAPER NUMBER     |
|  |             |                      | 2827                |                  |

DATE MAILED: 02/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

|                             |                         |                     |  |
|-----------------------------|-------------------------|---------------------|--|
| <b>Offic Action Summary</b> | <b>Application No.</b>  | <b>Applicant(s)</b> |  |
|                             | 09/936,359              | KURITA ET AL.       |  |
|                             | Examiner<br>Tuan T Dinh | Art Unit<br>2827    |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on \_\_\_\_\_.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-11 is/are pending in the application.
  - 4a) Of the above claim(s) 6 is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1 and 5 is/are rejected.
- 7) Claim(s) 2-4 and 7-11 is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 19 November 2002 is/are: a) accepted or b) objected to by the Examiner.
 

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. §§ 119 and 120

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

- 13) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
  - a) The translation of the foreign language provisional application has been received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

#### Attachment(s)

|  |  |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                    | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ . |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)           | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ . | 6) <input type="checkbox"/> Other: _____ .                                   |

**DETAILED ACTION**

1. Applicant's election with traverse of Group I (claims 1-5, and 7-11) in Paper No. 11 is acknowledged. The traversal is on the ground(s) that claims 1-11 are sufficient related that a through search for the subject matter. This is not found persuasive because examiner would treat claim 6 as an independent claim as a method of manufacturing a flexible wiring board, and claim 6 would be classified in a different class than claim 1-5, and 7-11.

The requirement is still deemed proper and is therefore made FINAL. Claim 6 is withdrawn from further consideration as being drawn to non-elected subject matter.

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al. (U. S. Patent 5,873,161) in view of Farnworth et al. (U. S. Patent 5,949,141).

As to claim 1, Chen et al. disclose a flexible printed wiring board as shown in figures 1a-1g comprising

a first flexible printed wiring part (20-figure 1a, column 5, line 44) having metal bumps (30-figure1d, column 5, lines 64-66) and a second flexible printed wiring part

(21-figure 1f, column 5, line 44) having connection pads (25, column 5, line 47), the metal bumps (30) and the connection pads (25) being connected to each other (see figure 1f),

wherein the first flexible printed wiring part (20) comprises a conductive layer (24, column 5, line 47) and an insulating layer (24, column 5, line 46) adjacent thereto; holes (26, column 5, line 50) are provided in the insulating layer (see figure 1b, the holes 26 are shown more in figure 2a) so as to reach the conductive layer (24).

Chen et al. do not disclose metal plugs are formed in said holes by an electrolytic plating method; and the tips of the metal plugs constitute the metal bumps that project from the insulating layer.

Farnworth shows a laminated film/metal structures as shown in figures 1A-1H comprising a conductor layer (22) and an insulating layer (22) formed as a flexible circuit board/substrate having a hole (30), and a metal plug (32) are formed in the hole (30) by an electrolytic plating method; and the tip (34) of the metal plug constitutes the metal bump that project from the insulating layer (22), see column 4, lines 9-30.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ a metal plug formed in a hole by an electrolytic plating method; and the tip of the metal plug constitutes the metal bump that project from the insulating layer in the flexible printed wiring board of Chen et al., as taught by Franworth et al. for the purpose of providing a uniform bump size and height formed in a flexible circuit board.

As to claim 5, Chen et al. shows an electrical interconnection between two circuit layers (20, 21, column 5, line 44) shown in figures 1a-1f that are stuck together by an adhesive layer (34, column 6, line 40), the adhesive layer (34) made by thermoplastic polyimide (column 6, lines 52-65).

***Allowable Subject Matter***

4. Claims 2-4, and 7-11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The references cited do not teach or render obvious in combination of a flexible printed wiring board having metal plugs that are electrolytic copper plating plugs, and metal bumps of a first flexible printed wiring part and pads of a second flexible printed wiring part being arranged in a zigzag fashion.

***Response to Arguments***

5. Applicant's arguments with respect to claims 1-11 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Masakazu et al., Angulas et al., Sobhani, and Inaba disclose related art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuan T Dinh whose telephone number is 703-306-5856. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kammie Cuneo can be reached on 703-308-1233. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0658.

  
Tuan Dinh  
January 11, 2004.